their abode in the pitcher are, like the insects that venture in, unable to get out again on account of the opposition to exit offered by the slipperiness of the walls of the conductive area. If this be so, they would be compelled, in case of attack, to seek safety in the lower parts of the pitcher; and while those too timid to take the plunge, or too weak to withstand the immersion, would be captured or destroyed, their instinctively bolder or physically hardier companions would be saved to transmit their characteristics; and so by a process of elimination and selection the instinct would be gradually brought to the state of perfection Mr. Everett has described.

Lastly, if it be wondered by what means the spider is able to resist the action of the fluid, and to regain its position of security in the upper part of the pitcher, it must be remembered, in the first place, that a great many spiders, as well as many insects, can be immersed in water and other liquids, and withdrawn in a perfectly dry state; and in the second place, that almost all spiders when dropping from their webs or leaping after prey, ensure a safe return to the spot they have left by letting out a drag-line of silk, which passes from the spinning mammillæ to the point of departure. A silken thread of this description would enable *M. nepenthicola* to climb out of the digestive fluid which retains the captured insects; while the nature of the integument and of its hairy clothing would prevent the penetration of the fluid during the short time that the spider remains beneath it.

R. I. POCOCK.

FERDINAND COHN.

ON June 25 last the career of one of the great botanists of the latter half of this century was brought to a close. During the span of a long life of seventy years Ferdinand Cohn has devoted his best energies to the advancement of botany, and the list of his papers in the "Royal Society Catalogue of Scientific Papers" bears witness to an unwearied devotion to his life work.

In his earlier years Cohn was amongst the foremost of those who were engaged on investigations into plant life and animal cells, and to the last it was the lowlier members of the vegetable kingdom that attracted his chief attention. But it was ever the striving after a deeper insight into the nature of the living organism that stands out as the keynote of his numerous researches, and the grasp which he possessed of the current problems is seen in one of his earlier papers on *Protococcus pluvialis*. In this memoir he brought forward cogent arguments in support of his view that the Protoplasm, recognised a few years before by Von Mohl as the essential living substance of plants, was identical with Sarcode, first described for animals by Dujardin; and Cohn's arguments were the more worthy of attention inasmuch as he was already familiar with, and was writing about, Infusoria. It is singular that Cohn's claims to have first established this great generalisation should have been so obscured by the work of Brücke and Max Schultze, since the memoirs of these investigators were published several years after Cohn's paper which appeared in 1850, and was shortly afterwards translated into English under the auspices of the Ray Society.

In those early years, from 1847 and onwards, new contributions to science flowed rapidly from the pen of the hard-working man. His papers on *Pilobolus*, *Empusa*, *Sphæroplea* and on *Volvox* are well known. Some of them were at once recognised as of prime importance, and were translated into English and French.

But Cohn's interest was by no means restricted to these channels, for several of his early works deal more especially with physiological problems. The injuries caused by lightning and the problems of disease also engaged his attention, and it was perhaps chiefly in connection with the latter class of questions that his later investigations were pursued. The importance of his work on Bacteria was long ago recognised, and the attitude which, in opposition to Nägeli, he maintained towards the pleomorphism of these organisms has turned out to be substantially the correct one. Naturally, however, it was not to be expected that genera distinguished at this (relatively) early period would prove to be natural ones, but the existence of independent species, also recognised by De Bary, is now everywhere admitted.

In addition to his work as a teacher and an investigator, Cohn's "Beitrage zur Wissenschaftliche Botanik" will always serve to keep his memory green in the minds of botanists. These volumes contain a large number of important papers, many of which were the direct outcome of his personal influence.

The "Kryptogamen-flora von Schlesien" also testifies to his editorial energy, and he was himself one of the most active members of the Schlesische Gesellschaft zu Breslau, and many of his papers are to be found in the records of this Society, to which also in his later years he contributed many valuable and suggestive reviews of current work; and these will always prove of permanent value to the historian of this period.

Cohn was a foreign member of the Royal and Linnean Societies of London, and the gold medal of the latter Society was awarded to him in 1895. Few men have more justly earned the respect of their fellows than he, and all might well profit by the example of his industrious career. He is gone, but his work remains as a lasting monument to his fame:—

> "Sicut fortis equus, spatio qui saepe supremo
> Vicit Olympia, nunc senio confectu' quiescit."

J. B. FARMER.

NOTES.

THE French Association for the Advancement of Science will this year hold its meeting at Nantes, from August 4 to 11.

THE annual general meeting of the Victoria Institute was held on Monday afternoon last, when Sir George Stokes delivered his presidential address. The subject of the address was "The Perception of Colour."

THE Council of the British Medical Association resolved at its last meeting to found as a memorial of the late Mr. Ernest Hart a scholarship to be called "The Ernest Hart Memorial Scholarship for Preventive Medicine." It was felt that no more fitting means could be found to commemorate at once Mr. Hart's great services to the British Medical Association and to the advancement of the study of preventive medicine. The scholarship, which will be of the annual value of 200*l.*, will be tenable for two years.

AT the recent Council meeting of the Iron and Steel Institute, Prof. Roberts-Austen, C.B., F.R.S., was elected to succeed Mr. Martin Dowlais as president of the Institute.

SIR MARTIN CONWAY has started for Bolivia. It is his intention to explore the high group of the Andes containing the peaks Illimani and Illampu (or Sorate). He is accompanied by the Alpine guides Antoine Maquignaz and Louis Pellissier, who made the first ascent of Mount St. Elias in Alaska last year with the Duke of Abruzzi.

PROF. MAX WEBER, the well-known zoologist of the University of Amsterdam, will leave Europe in October next, for Sourabaya, Java, to take command of a scientific expedition, projected by the Society for the Biological Investigation of the Netherlands Colonies, for the zoological, botanical and oceanographical exploration of the seas of the Indian Archipelago. The course of the expedition, which will last about a year, is divided into two sections. The first, starting from Sourabaya, will pass through the Timor and Tenimber groups of islands to the Aroos and Ké Islands and thence to Banda or Amboina, a total distance by the route selected of about 2500 English miles. The second section, starting from Banda or Amboina, will pass between Halmaheira and Celebes through the chain of islands leading up to the Philippines, and then return to Java by the channel between Celebes and Borneo, making a traject of some 3000 miles. Looking to the advantages derived from Prof. Weber's previous experience in exploration of this nature and his well-known devotion to the subject, there can be little doubt that this expedition will result in large additions to our knowledge of the fauna, flora, and physical structure of the East Indian Archipelago.

MR. A. P. LOW, of the Geological Survey of Canada, has gone to Labrador for the purpose of studying the geological formations, and to make a map of the region. He expects to be absent for eighteen months.

THE second Huxley Lecture on "Recent Advances in Science, and their bearing on Medicine and Surgery" will be delivered at the Charing Cross Hospital Medical School on Monday, October 3, by Prof. Virchow of Berlin. It will be remembered that the first Huxley lecturer was Prof. Michael Foster, F.R.S., and that his discourse was printed in these columns. Prof. Virchow's lecture will, it is stated, be delivered in English.

THE summer session of the Institution of Mechanical Engineers will take place at Derby, commencing on Tuesday, July 26. The following papers have been offered for reading and discussion, not necessarily in the order here given:—Manufacture of aluminium articles, with description of the rolling mills and foundry at Milton, Staffordshire, by Mr. Emanuel Ristori; water softening and purification by the Archbutt-Deeley process, by Mr. Leonard Archbutt; mechanical testing of materials at the locomotive works of the Midland Railway, Derby, by Mr. W. Gadsby Peet; electric current for lighting and power on the Midland Railway, and driving direct by electric motor without shafting, by Mr. W. E. Langdon; narrow-gauge railways, 2 feet and under, by Mr. Leslie S. Robertson; results of recent practical experience with express locomotive engines, by Mr. Walter M. Smith.

THE summer meeting of the Institution of Junior Engineers will be held at Liverpool, from August 8 to 13. The president-elect of the Institution is Sir W. H. White, K.C.B., F.R.S.

THE summer assembly of the National Home-Reading Union will be held at Exeter during the last week of the present month. The inaugural address will be delivered by Sir George W. Kekewich, K.C.B., Secretary of the Education Department, who will take as his subject "The National Home-Reading Union in its Relation to Elementary Education," and short courses of lectures upon the architecture, botany, and geology of the district will be given by Mr. Francis Bond, Prof. Baldwin Brown, Mr. A. W. Clayden and Prof. Weiss. Copies of the full programme may be obtained from the office of the Union, Surrey House, Victoria Embankment.

Science announces that the Academy of Natural Sciences of Philadelphia has received from Miss Anna T. Jeanes a gift of 20,000 dollars to be invested and known as the Mary Jeanes Museum Fund, the income to be used for general museum purposes.

THE Hayden Memorial Geological Award for 1898, consisting of a bronze medal and the interest of the endowment fund, has been conferred upon Prof. Otto Martin Torell, the director of the Geological Survey of Sweden, by the Academy of Natural Sciences of Philadelphia.

THE Belgian Government, setting an example to those of larger and wealthier nations, has offered a premium of 50,000 francs to the inventor of a paste for match-heads free from yellow phosphorus, and capable of igniting upon any dry surface. The conditions under which the competition will take place have been determined by the Ministry, who have agreed that it shall be international, and remain open until January 1, 1899.

AS will be seen by a reference to our advertisement columns, a prize of 500 guineas is offered by the Sulphate of Ammonia Committee for the best essay on the subject of "The Utility of Sulphate of Ammonia in Agriculture," treated from a practical and scientific point of view. All essays sent in must be written in the English language, on one side of the paper only, and bear a distinguishing motto or *nom de plume*, and reach the Chairman of the Committee not later than November 15 of the present year.

PROF. O. C. MARSH has transmitted from New Haven to the Director of the United States Geological Survey the fourth large instalment of vertebrate fossils secured in the West in 1882-92, under his direction, as palæontologist of the United States Geological Survey in charge of vertebrate palæontology. The collection, which is packed in one hundred boxes and weighs over thirteen tons, will, in accordance with law, be deposited in the National Museum. The collection includes twelve skulls and other remains of the gigantic *Ceratopsia* from the Cretaceous; various *Dinocerata* fossils from the Eocene; a series of rare specimens of *Brontotherium*, *Elotherium*, *Miohippus* and other genera from the Miocene; a very extensive collection of rhinoceros and other mammals from the Pliocene, as well as various interesting fossils from more recent deposits. Other collections at present at New Haven will be sent to Washington as soon as their scientific investigation, now in progress, has been completed.

A CIRCULAR letter on the subject of railway passenger communication has been issued by the Board of Trade to the general managers of the different railway companies, calling attention to the recently issued report of the Departmental Committee, which unhesitatingly condemns as inefficient the outside cord system of communication, and does not regard as satisfactory existing methods of communication by pulling a cord or wire passing inside the carriages. The views expressed by the Committee as to the inefficiency of the outside cord communication are fully shared by the Board of Trade, who have for years refused to approve it. It is recommended that the law should be extended so as to require the provision of means of communication on all passenger trains, irrespective of the distance run without a stop. The letter states that the Board attach great importance to the conclusions of the Committee, and that they hope the companies by whom the cord system is still used will at once take steps to substitute for it a proper means of communication, and that the companies will, as a whole, extend the provision of such a means to all passenger trains without waiting for an alteration of the law. It is to be sincerely hoped that the railway companies, to whom the suggestions contained in the letter apply, will set to work to remedy what has been, and still is, a crying evil on many lines of railway.

SOME time ago the Public Control Committee of the London County Council received from the Departmental Committee of the Home Office, which is at present considering the questions of the manufacture and supply of water gas, an inquiry as to the opinion on the subject of the Public Control Committee. This opinion has now been communicated, and is as follows: (1) That considerable danger arises from the introduction of water gas in the process of the enrichment of coal gas; (2) that non-carburetted and non-odorised water gas should not be allowed to be used under any conditions, since it is devoid of smell which would give warning of any escape of the gas; (3) that 25 per cent. should be the *maximum* amount of water gas allowed to be introduced in the enrichment of coal gas, the proportion of water gas being ascertained by determining the amount of carbonic oxide in the rich coal gas (coal gas enriched to this extent would correspond in poisonous character to the Dowson gas, which is already in use for heating purposes and for gas engines, and would exclude the use of carburetted water gas); (4) that when it is proposed to supply poisonous enriched gas to houses and the interior of buildings, a proper inspection be made of the service pipes by a responsible officer appointed by the local or other suitable authority, who should certify that the pipes are in a sound condition and that there is no escape of gas, and that the cost of such inspection be borne by the gas company.

WHAT will be, we should imagine, a boon to electrical engineers has been brought about by the Patent Office having undertaken to supply the Institution of Electrical Engineers every Monday morning with a copy of each electrical patent specification published during the preceding week. The specifications will remain on the table of the Institution for three weeks, and will then be filed.

THE banquet given to the ladies by the Leathersellers' Company at their Hall on the 13th inst. was a very brilliant affair. The life-size portrait of the ex-Master, Dr. Perkin, F.R.S., painted by Mr. Henry Grant, and placed on an easel for close inspection, which it bore well, was an interesting feature of the evening. The Master, Colonel Bevington, "thought all would agree with him that the artist had succeeded in painting a perfect likeness of the learned doctor, and as good a picture as any they already possessed." It represents Dr. Perkin giving an address to the Society of Arts.

AFTER distributing the prizes to the successful students of the Guy's Hospital Medical School on Wednesday, July 13, Mr. Arthur Balfour delivered an interesting address on the subject of the medical profession and its work. In the course of his remarks he said there was a period at which almost the only subsidiary sciences to the art of healing, the only ones of practical value, were anatomy and physiology. But all that has been changed, and at the present moment, if a man is to make progress in medical research, he must draw his inspiration not merely from those sciences which deal with the human organism immediately, but from chemistry and almost every branch—he thought he might say every branch—of physics. But while that tendency has on the one side been making itself manifest, while the interdependence of all these sciences is becoming more and more manifest, while the assistance which each can and must give to the other is becoming more and more evident, the separate sciences themselves are so rapidly accumulating facts, are growing so enormously that specialisation is necessarily and inevitably set up in every one of them, so that you have the double tendency of an interdependence between the sciences which makes it necessary for every man who would further any one of them to have some working acquaintance with many others, but at the same time you have specialisation forced upon you by the accumulation—the rapidly increasing accumulation—of facts in every one of the sciences of which he had spoken. The result of this double tendency is that you must rely more and more for your work and research upon people whose main labour is research. You cannot expect a man in the interstices of a busy life, in the interstices of a great practice, to do much towards the advancement of his science. . . . The man who would succeed in research, the man who, at all events, desires to devote himself to research, must not be asked to burden himself with other labours. He has upon his shoulders not merely what might be called the specialised work of his profession, but he must have a sympathetic and appreciative eye to everything which is going on in other departments of science, so that even where he cannot follow those other departments minutely, he knows by the instinct of genius where to pick up those new discoveries which may help his own special branch of research. For men of that kind we required further endowment. The speaker had all his life been an ardent believer in the cause which is often laughed at—the cause of the endowment of research. In that cause he most firmly believed, and he thought there was no branch of knowledge in which it may find a more useful field of application than in that of advancing medical knowledge. . . . The work of the medical practitioner is seen at once; its value can be immediately appreciated; but he who spends his life in pursuit of the secrets of nature, working in his laboratory, may very often receive no public recognition at all during his life, except from that restricted circle of experts who alone are, after all, capable of forming any valuable estimate as to his merits.

THE young male giraffe, lately received in the Zoological Society's Gardens, is of special interest as representing the Northern form of this animal in contrast to the Southern female which arrived in February 1895, but the differences between them will be much more apparent when both the specimens are adult. Although the fact of the Northern giraffe being different from the Southern form has been suggested by various authors, and several names have been given to each of them, the subject was first placed on a sound basis by Mr. W. E. de Winton in his paper "On the Existing Forms of Giraffe," read before the Zoological Society in February 1897. It was there shown most conclusively that the Northern form, to which Mr. de Winton proposes to restrict the name *Giraffa camelopardalis*, is distinguished from the Southern form by several characters, especially by the great prominence of the third frontal horn, which is barely shown in the Southern form (*Giraffa capensis*). The young giraffe from Senegal, just arrived, belongs to the Northern form, which would appear to extend all across the Sahara into North-eastern Africa. The Cape giraffe seems to be met with in suitable localities all up the east coast into British East Africa, where it is stated that both the forms occur.

REFERENCE has often been made in these columns to the importance of attention to forestry, and we are glad to notice that the Royal Scottish Arboricultural Society has published a memorandum, prepared by the Society for the consideration of the Minister of Agriculture, dealing with the subject of a Scottish model State forest. Commenting upon the memorandum, the *North British Agriculturist* says: "We require a model forest, first of all, that we may be in a position to offer to proprietors, their wood managers and foresters, a practical proof that the principles of modern economic forestry, as taught and practised in France, Germany, India, and other countries, are equally suited to our islands. The model forest is also required as a station of experiment and research into matters connected with the development and characteristics of the various species when grown in this country, such as would indicate the correct sylvicultural treatment to be applied to them, and would enable our teachers of sylviculture to base their instructions on data obtained in this country, instead of relying on figures the result of observations conducted elsewhere. Again, we want a model forest as a field of practical instruction for students. Dr. Schlich writes: 'Something more is wanted than theoretical instruction. Instruction in the field must also be provided. There must be forests which are managed on the right lines, where students find the theory of economic forestry practically illustrated.' At the present time, Edinburgh is the only place in Scotland where lectures on forestry are given; and there does not appear to be any immediate necessity for the establishment of lectureships at other centres. It is the best policy to concentrate our efforts in one place, and to leave nothing undone to improve the facilities for teaching here, rather than to dissipate our strength in attempts to sustain the machinery of instruction in several places. . . . In view of the fact that students, while attending the forestry classes in Edinburgh, are either following other courses of study at the same time, or are employed in the city, it is essential that a model forest for their practical instruction should be provided within such a distance of Edinburgh that they may be able to visit it and return on the same day, as is now done by the students who visit woods in the Lothians, Fife, and other places."

A PRELIMINARY account of the fifth international balloon ascents of June 8 last is given in *Ciel et Terre* of the 1st inst. On the whole, the undertaking met with considerable success, and the results show that an immense field is open for the meteorological and physical investigation of the upper atmosphere. The operations extended from the longitude of Paris to that of St. Petersburg, and from the latitude of the latter place to that of Rome. The three Austrian balloons travelled in the direction of Hungary, and in the *Austria*, Lieut. Hinteroiser reached the height of 4500 metres, and registered a temperature of 17°·6 F. An unmanned balloon, which left Paris in the morning, descended in Westphalia in the afternoon, having reached a height of about 16,000 metres, and recorded a temperature of minus 83° F. Of three unmanned balloons sent up by M. Teisserenc de Bort, from his observatory at Trappes, near Versailles, one travelled 160 kilometres, and registered a temperature of minus 76° at an altitude of 12,500 metres. A similar balloon from Strassburg recorded minus 58° at a height of eleven kilometres. The highest level reached by the mounted balloons was that manned by M. Berson, which left Berlin at about 2h. 30m. a.m. It travelled 160 kilometres, and reached a height of 5500 metres, but only registered a temperature of 10°·4, while another balloon, manned by Lieut. Siegsfeld, registered 17°·6 at 4500 metres. A large unmanned balloon from Paris carried for the first time one of Violle's actinometers. This instrument worked perfectly, and has furnished some interesting results, which do not, however, agree entirely with theoretical ideas. Regret is expressed that this country has as yet taken no part in the exploration.

A REPORT has been received at the Foreign Office from the acting British Consul-General at Hamburg, stating that a Bill will probably be submitted to the German Government for the construction of an inland canal passing through the provinces of the Rhine, Westphalia, Hanover, and Bevergern Elbe, to be known as the "Dortmund Rhine" Canal. The estimated cost of the canal is 6,400,000*l*.

THE Committee of the Society for the Protection of Birds has issued a circular letter urging landowners, shooting tenants and farmers to use their authority with their keepers and others to prevent the free destruction of birds on their land, and to give instructions as to what birds only may be destroyed, which, in the words of the circular, "should properly be only those birds that, from their abundance in any particular district, may do real harm."

THE geological history of the recent flora of Britain was discussed by Mr. Clement Reid in the *Annals of Botany* for August 1888; the author has now contributed further observations on this subject to the same journal for June of this year. During the past ten years much new information has been gathered, and this is summarised in a table showing the geological range of the various species of British plants which have been found in a fossil state; the chronological divisions adopted being Preglacial, Early Glacial, Interglacial, Late Glacial, and Neolithic. About one-seventh of our flowering plants are thus recorded. The orders best represented are mainly those which possess hard fruits or seeds specially adapted for dispersal, and those with deciduous leaves. Mr. Reid remarks that it is doubtful whether a single one of our flowering plants is, strictly speaking, a native of Britain. The whole flora has originated probably in other and various parts of the world. We find now merely the species stranded by successive waves of migration, which have brought together a variety of continental forms, some Arctic, some Southern, a few even American. These migrations were, in his opinion, mainly compelled by climatic changes, though other agencies have played an important part. He thinks it probable that a far larger proportion of our plants was introduced by human agency than is generally believed to have been the case.

IN all text-books, and on the latest maps of Siberia, the coasts of the Arctic Ocean are represented as a flat *tundra* soaked with water. Dr. K. Hikish points out, in an orographical sketch of North Siberia (*Memoirs* of the Russian Geographical Society, vol. xxi. "General Geography"), that this is quite incorrect. Only the Ob region is a real low depression, which attains the Arctic Ocean and ends in low flat shores. In the east of the Yenisei there are no low depressions in Siberia, with the exception of a small one at the mouth of the Lena. The northern coasts of Siberia, from the Yenisei eastwards to Bering Strait, are high, as was known from the earlier explorers, and has been confirmed lately. There are only deltas at the mouths of the Olenek, the Lena, the Yana, and the Indighirka. In the east of the Kolyma the coasts become even hilly, leaving but a narrow strip of low land along the sea beach. Hilly tracts are met with at a short distance from the shores inland.

AT a recent meeting of the Paris Biological Society, M. Courmont gave an account of some experiments he had made with anti-streptococcic serum. He immunised an ass by inoculating it with a culture of streptococci derived from a case of human erysipelas, and thus obtained a serum which rendered a rabbit perfectly immune against these streptococci. He had also isolated eleven kinds of streptococci from erysipelas or suppurating lesions in human beings, and tried the serum obtained from the ass against these. Of the eleven different streptococci seven only were influenced by the serum. Even then, if an ass be inoculated with two samples of streptococci, it is not possible to obtain a serum efficacious against all kinds of streptococci, for the various kinds of this organism are too different for one anti-streptococcic serum to overcome them all.

THE Colonial Bacteriological Institute, attached to the Cape of Good Hope Department of Agriculture, has issued its report for the year 1896. Though belated in appearance, it is a valuable document as indicating the importance of the work carried out at the Institute. Besides the elaborate experimental investigations which have been conducted on rinderpest, we note various other directions in which the activities of the staff have been engaged. For example, no less than 1039 culture tubes of a locust-destroying fungus have been forwarded to different parts of the country, and the reports received as to the efficacy of this fungus are very encouraging. In order that the best results may be obtained, it is recommended that the Veldt should be inoculated twice a year, as the cold of winter seems to act deleteriously on the fungus. Mallein and tuberculin, for the detection of glanders and consumption, are also now produced at the Institute, and arrangements were being made, when the report before us was drawn up, for the elaboration of anti-venomous serum, as well as an anti-toxin for tetanus. The staff is, the Director points out, lamentably insufficient to carry on even the work at present undertaken by the Institute, and the appeal for more assistance is certainly amply justified by the record of what has been already done by the Department.

IN the part of the *Journal* of the Asiatic Society of Bengal issued on April 14, Mr. Frank Finn, of the Indian Museum, brings to a conclusion his series of four papers entitled "Contributions to the Theory of Warning Colours and Mimicry." The paper in question deals with experiments with various birds, from a consideration of which the author draws the following conclusions: (1) That there is a general appetite for butterflies among insectivorous birds, even though they are rarely seen when wild to attack them. (2) That many, probably most species, dislike, if not intensely, at any rate in comparison with other butterflies, the "warningly-coloured" *Danainæ*, *Acræa violæ*, *Delias eucharis*, and *Papilio aristolochiæ*; of these the last being the most distasteful, and the *Danainæ* the least so. (3) That the mimics of these are at any rate relatively palatable, and that the mimicry is commonly effectual under natural conditions. (4) That each bird has to separately acquire its experience, and well remembers what it has learned. That therefore, on the whole, the theory of Wallace and Bates is supported by the facts detailed in this and the author's former papers, so far as they deal with birds (and with the one mammal used). Prof. Poulton's suggestion that animals may be forced by hunger to eat unpalatable forms is also more than confirmed, as the unpalatable forms were commonly eaten without the stimulus of actual hunger—generally without signs of dislike.

THE most recent number of *Malpighia* (Anno xii. fasc. 3, 4) contains a description by Prof. Mattirolo of the *Nuova sala Aldrovandi* founded in honour of the Italian botanist (1549-1605), in connection with the University of Bologna, and opened in December 1897. It comprises a museum, a library, and a herbarium founded on that of Aldrovandi. The account is accompanied by a portrait and a drawing of the library. In the same number is a portrait and a brief sketch of the botanical work of Zannichelli.

THE geology of the Bacau Carpathians forms the subject of an essay by Dr. W. Teisseyre (*Jahrb. der k.k. geol. Reichs.*, Bd. 47, 1898). The strata comprise various members of the Tertiary system, highly inclined, folded, inverted, and overthrust; and sundry drift and alluvial deposits. The district is noted for its oil-springs and mineral waters, and also for its salt-deposits, which occur in both Palæogene (Eocene-Oligocene) and Miocene formations.

The Agricultural Gazette of New South Wales is an admirable journal, and contains a mass of most useful articles which are not only well written, but, in many cases, carefully illustrated. It is issued monthly, and contains in each part notes on fruit, vegetable, and flower culture for the month, besides a number of articles by experts on matters of special interest to the agriculturist. Particular prominence is given to bee-farming, and, in addition to the regular bee calendar, a series of articles on "Bees, and how to manage them" is contributed by Mr. Albert Gale, and the practical and scientific staff attached to the *Gazette* now undertake to investigate bee diseases with a view to reporting on their cause, prevention and cure. The *Gazette* is written by practical men, and is intended for the use of practical men, and should prove of great value to all engaged in agricultural pursuits.

THE results of an investigation of the catalytic influence of various gases and vapours on the oxidation of phosphorus are published by Herr Centnerszwer in a recent number of the *Zeitschrift für physikalische Chemie.* The fact that the luminosity of phosphorus in air is increased by small quantities of certain gases and inhibited by others has long been known, and was in particular investigated by Thomas Graham. According to Graham, one part of turpentine in 4440 of air by volume destroys the luminosity at the ordinary temperature. At a later period Joubert finally established the fact that luminosity and oxidation go hand in hand, and that inhibited phosphorescence could be, as in the case of pure oxygen, resuscitated by a reduction of pressure. The experiments of Herr Centnerszwer have extended over a large range of organic substances. It is found that their specific influence admits of certain general conclusions. Thus it increases in a homologous series as the number of carbon atoms increases; it is approximately the same for isomers; it is increased by a double linkage of carbon atoms; it is not greatly affected by the substitution of chlorine or bromine for hydrogen, but is increased in a high degree by the replacement of hydrogen by iodine. The results have, however, not given any clear insight into the mechanism of the process by which the oxidation is suspended.

THE preparation of sodium perborate $NaBO_3+4H_2O$, corresponding to an oxide B_2O_5, is described by M. Tanatar in the *Zeitschrift für physikalische Chemie.* The salt is prepared by the electrolysis of a concentrated aqueous solution of sodium orthoborate, or by oxidation of sodium orthoborate by means of hydrogen peroxide. The corresponding ammonium salt, with one molecule of water, may be prepared in the same way. The perborates are described as powerful oxidising agents, but as quite stable *per se*.

THE *Engineering Magazine* sustains its reputation as one of the best illustrated and most varied in contents of the magazines devoted to trade interests. The July part has just reached us, and contains, among other items, papers on "Sea Power at the end of the Nineteenth Century," "Some Features of Indian Railways," "The Cyanide Process as applied on the Rand," "Applications of Electro-Chemistry," and "Architectural Wrought Iron Ornament." The excellence of the illustrations in the second and last-named articles call for a special word of praise.

A NEW edition—the fifth—of Prof. Schäfer's "The Essentials of Histology" has reached us from the publishers, Messrs. Longmans and Co. The book is so well known that we need do no more than call attention to the appearance of this its latest edition.

MR. H. K. LEWIS has just brought out the second edition of "Practical Organic Chemistry" by Dr. Samuel Rideal. It differs from the first issue in the addition of several organic substances which have recently been included in the schedules for various examinations, and a few other compounds which are of general interest.

NOTICES have appeared from time to time in these columns of the monthly issues of the *Journal* of the Essex Technical Laboratories, and it is now not necessary for us to do more than announce that the third volume of the work has just been published by Messrs. Durrant and Co., Chelmsford, and that it is full of information of value to farmers, horticulturists and others.

Science Progress for July contains, among other contributions, the interesting lecture on "The Fall of Meteorites in Ancient and Modern Times," which was delivered at Oxford in February last by Prof. H. A. Miers, F.R.S.

THE additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcarius*, ♂) from South Africa, presented by Dr. Suffield; a Brown Capuchin (*Cebus fatuellus*) from South America, presented by

Mrs. Wallace; a Lion (*Felis leo*, ♂) from North Africa, presented by Mr. P. B. Vanden Byle; a Grey Parrot (*Psittacus erithacus*) from West Africa, presented by Mr. Palmer; a Cardinal Grosbeak (*Cardinalis virginianus*) from North America, presented by Mrs. Chambers; two Shags (*Phalacrocorax graculus*) from Scotland, presented by The Maclaine of Lochbuie; three European Pond Tortoises (*Emys orbicularis*) from Italy, presented by Miss E. Endicott; two Axolotls (*Amblystoma tigrinum*) from Central America, presented by Mr. W. R. Temple; a Chameleon (*Chamæleon vulgaris*) from North Africa, presented by Mr. Clyde Hinshelwood; two Common Snakes (*Tropidonotus natrix*) from Germany, presented by Mr. A. Waley; two Orang-outangs (*Simia satyrus*, ♂ ♀) from Borneo, a Squirrel Monkey (*Chrysothrix sciurea*) from Brazil, a Gentoo Penguin (*Pygosceles tæniatus*) from the Falkland Islands, a Maguari Stork (*Dissura maguari*) from South America, two Thick-billed Penguins (*Eudyptes pachyrhynchus*) from New Zealand, a Jardine's Parrot (*Pœocephalus gulielmi*) from West Africa, two —— Honey-eaters (*Ptilotis*, sp. inc.) from Australia, two Elephantine Tortoises (*Testudo elephantina*), a —— Tortoise (*Testudo*, sp. inc.) from the Aldabra Islands, deposited; five Bridled Wallabies (2 ♂, 3 ♀) from Australia, five Ruffs (*Machates pugnax*), two Redshanks (*Totanus calidris*), two Spoonbills (*Platalea leucorodia*), European, ten Common Chameleons (*Chamæleon vulgaris*) from North Africa, purchased; a Macaque Monkey (*Macacus cynomolgus*), two Japanese Deer (*Cervus sika*, ♂ ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

COMET PERRINE (JUNE 14).—The following is the ephemeris for comet Perrine for the ensuing week:—

1898.	R.A.			Decl.		Br.
	h.	m.	s.	°	′	
July 21	6	38	7	+38	52·3	3·96
22		42	6	37	58·0	
23		46	4	37	2·6	
24		49	59	36	5·9	
25		53	51	35	8·1	4·67
26		57	41	34	9·1	
27	7	1	29	33	8·9	
28	7	5	16	32	7·5	

A NEW FORM OF GRATING SPECTROSCOPE.—Prof. Michelson describes, in the *Astrophysical Journal* for June, a spectroscope which seems specially adapted for examining any particular line in a spectrum. The idea is that in a grating it is desirable sometimes to be able to throw a large proportion of light into very high orders of spectra—the hundredth, for example—and according to the arrangement here adopted the method seems quite simple. The problem becomes still more simple if the grating be arranged for transmission, as the grating can then be efficiently constructed if one can make a considerable number of plane-parallel plates of glass of the same thickness. Using only seven elements—that is, seven of these plates of glass arranged in step fashion—and placing them between a collimator and an observing telescope, and the collimator slit illuminated by a sodium flame, the broadening of the lines could be easily detected, and the Zeeman effect readily observed when the sodium flame was placed in a magnetic field. The resolving power of this instrument being independent of the number of glass plates, but depending only on the total thickness, the only advantage gained in using a large number of elements is that the spectra are more separated. With a few elements the spectra overlap; but this, as is pointed out, does not make much difference if effects of broadening, shifting or doubling of single lines be alone attempted. A spectroscope with twenty elements has already been in use in the Ryerson Physical Laboratory, and Prof. Michelson is now having another constructed giving greater resolving power, and sufficient for the analysis of close groups of lines.

STRUCTURE OF THE H AND K LINES.—Mr. Jewell tells us (*Johns Hopkins University Circular* for June) that while examining a series of photographs of the solar spectrum made by Prof. Rowland in 1888 and 1889, he discovered one plate on which the shading of the H and K lines of calcium was broken up into bands or series. These bands were noticed to begin at the centre of the shaded lines and extend outward, the distance between the component lines of the series increasing as the distance from the centre increased. Further, the series were perfectly symmetrical about the centres about H and K, and the individual lines or components somewhat nebulous, while nearly all the other lines in the same region were sharp and clear. Since that date Mr. Jewell has not been able, except quite recently, to detect this peculiarity in the photographs taken by himself; but, on March 11 last, a plate was exposed to the arc spectrum of calcium (λ 4000) under somewhat special conditions, and this showed the shading broken up into series. The shading on the red side of H was quite distinctly broken up into series similar to those of the solar spectrum mentioned above. The series on the violet side was not so distinct; while the shading is better on the violet side of K than on the red side. Mr. Jewell further says that the resolution into lines is hardly perceptible close to the principal line, but is fairly distinct about three Ångström units from H. Curiously enough, the lines of the series in the arc spectrum plate are reversed; but some distance away from the central lines it is probable that they are continued as emission lines.

To obtain this negative an extremely powerful direct electric current was used, being allowed to act for a short time before the image of the poles was thrown on the slit of the spectroscope, the length of exposure being three to four seconds. In this way the calcium was highly volatilised, and the "highly heated vapour formed a much more extended atmosphere around the poles than with a weaker current; and it is also possible that the conditions throughout the larger part of the arc were more uniform than under ordinary circumstances." Mr. Jewell thinks that, in the case of the solar spectrum referred to, the slit of the spectroscope probably covered a region of the sun's atmosphere where the principal layer of the calcium was of a particular density, and being thus to a degree isolated was able to produce its characteristic series. This, he says, is somewhat confirmed in that the general shading of H and K on the plate is unusually weak.

BLURRING ABERRATION IN THE TELESCOPE.—In the note which previously appeared in this column (May 26, p. 88), we referred to Mr. Collins' paper on this subject, and remarked that the tilting of the image not only occurs in the case of the reflector, but in that of the refractor also; the effect in the latter case being twice as great as that in the former. We should, however, have made it clearer if we had stated that the tilt is really the same in both instruments of like angular aperture, but the difference in the inequality of size of the images formed from the "marginal" and "central" portions of aperture focussed on a single focal plane is twice as great in the ordinary refractor as with the reflector. The images formed from the central portion of the reflector are smaller than those formed by the marginal rays, while with the refractor the marginal rays produce smaller images than the central rays passing through the lens.

THE LIFE-HISTORY OF THE SALMON.[1]

THE investigations recorded at length in this Report are partly of biological, partly of more purely physiological interest. They were undertaken with the following objects:—

(1) To elucidate some of the factors governing the migration of the salmon, and to study the course of these migrations.

(2) To determine whether or not Miescher is right in his contention that salmon do not feed during their sojourn in fresh water.

(3) If salmon while in the river do not procure an abundance of food, to investigate from what source they obtain the energy for the large amount of muscular work they perform, and whence comes the material to build up the enormous genitalia which are developed before spawning. Such an investigation must necessarily yield information of interest as to the chemical changes of various substances in the animal body.

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[1] "Report of Investigations on the Life-History of the Salmon in Fresh Water." From the Research Laboratory of the Royal College of Physicians of Edinburgh. Edited by D. Noël Paton, M.D., Superintendent of the Laboratory. A Report to the Scottish Fishery Board presented to Parliament by command of Her Majesty. (John Menzies and Co., Edinburgh)